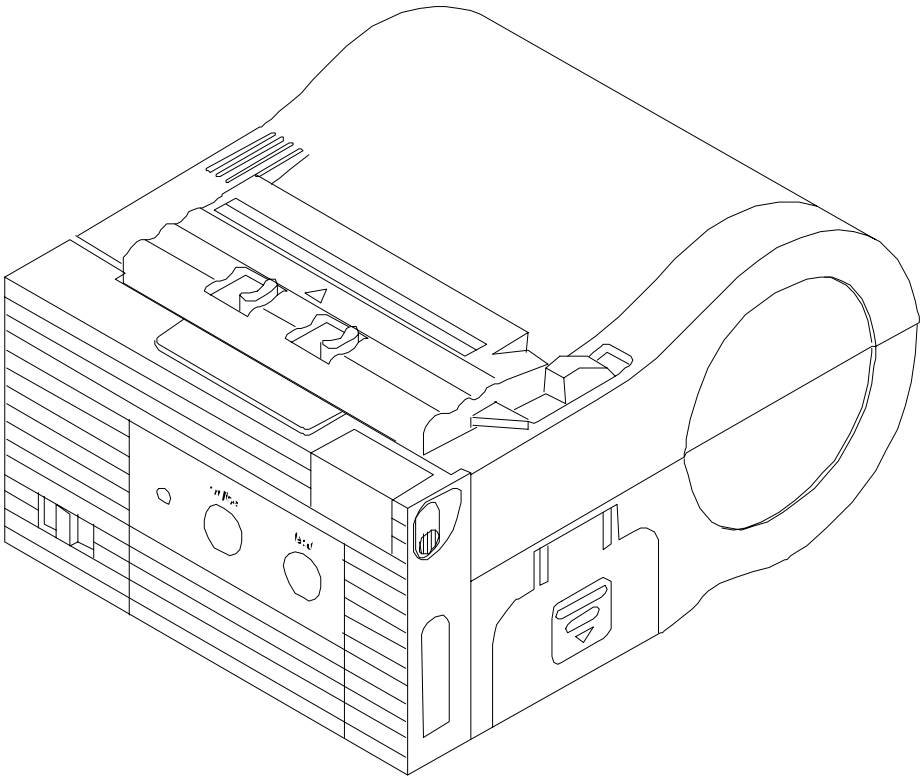
DCS & Labeling Worldwide

MB200
Direct Thermal Printer



OPERATOR MANUAL

PN 9001126A

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Warning: This equipment complies with the requirements in Part 15 of FCC rules for a Class B computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take whatever steps are necessary to correct the interference.

TABLE OF CONTENTS

INTRODUCTION

General Description 1-2
Theory Of Operation 1-2
Switches And Indicators 1-3
Connection Ports 1-3

TECHNICAL DATA

Physical Characteristics 2-1
Power 2-1
Enviromental 2-1
Print 2-1
Media 2-1
Sensing 2-2
Interface Modules 2-2
Processing 2-2
Character Font Capabilities 2-2
Barcode Capabilities 2-2
Regulatory Approvals 2-3

INTERFACE SPECIFICATIONS

Interface Types 3-1
Factory Defaults 3-1
Interface Configuration 3-1
RS232 Serial Interface 3-2
TTL Interface 3-3
Infrared Data (IrDA) Interface 3-4
ACK/NAK Protocol 3-5
Receive Buffer 3-6

CONFIGURATION

Dip Switch Complex DSW1 4-2
Dip Switch Complex DSW2 4-3
Dip Switch Complex DSW3 4-3
Configuration Modes 4-4
Normal Mode 4-5
Sleep Mode 4-6
Auto Power Off Mode 4-7
Dispenser Mode 4-8
User Test Print Mode 4-9
Default Settings Mode 4-10
Hex Dump Mode 4-11
Factory Clear Mode 4-12
Font Download Mode 4-13
Program Download Mode 4-15

TROUBLESHOOTING

Error Signals 5-1
Troubleshooting Table 5-1
RS232 Serial Interface Troubleshooting 5-2
Diagnostic Label Printing 5-3

MAINTENANCE

Cleaning 6-1
Platen Roller 6-3
Drive Motor 6-4
Drive Gear 6-6
Feed Roller 6-7
Main Circuit Board 6-8
IrDA Sensor 6-10
Gap Sensor 6-11
Eye-Mark Sensor 6-13
Head-Open Switch 6-15

ADJUSTMENT PROCEDURES

Position Adjustments 7-1

1 INTRODUCTION

This manual is laid out consistent with the product discussed and provides all of the information required for general printer configuration, troubleshooting, and maintenance. For specialized programming, refer to the Programming Manual located on the utility CD-ROM.

Step-by-step maintenance instructions are provided with typical problems and solutions. It is recommended that you become familiar with each section before installing and maintaining the printer.

This manual also incorporates the use of special information boxes. Examples of these boxes and the type of information provided in each, are below.

WARNING: PROVIDES INFORMATION THAT, IF UNHEEDED, MAY RESULT IN PERSONAL INJURY.

CAUTION: PROVIDES INFORMATION THAT, IF UNHEEDED, MAY RESULT IN EQUIPMENT DAMAGE.

NOTE: Provides helpful hints to assist in performing the tasks at hand.

A comprehensive Table Of Contents provided at the front of this manual facilitates rapid movement within. The contents identify the different unit sections and their respective sub-sections. Each references the page number of their commencement.

The pages of this manual has embedded headers and footer to assist the user in identifying his or her exact position within the manual. The header provides the section number followed by its name. The footer identifies the product on the left, the manual's part number in the center, and the page number to the right side of the page.

Page inumeration is two-part with each separated by a hyphen. The first character set references the section number and the second identifies the page number. Page numbers begin with the numeral (1) one at the commencement of a new section and ascends sequentially.

GENERAL DESCRIPTION

The MB400 is a compact, transportable printer designed for frequent, but intermittant use. Its direct thermal print head not only allows high performance two-color printing, but also clear barcode printing. It can also enlarge and print various types of fonts and Kanji characters in a free layout.

Its ABS housing with protective rubber boots provide a durable, impact-resistant product. Over-sized control buttons and shoulder strap ensures ease of use during transport. An intergrated dispenser enables application of labels upon print. Rechargeable battery packs and a DC power transformer ensures operation anywhere, under any conditions. An automatic power off function turns the printer off after the last print.

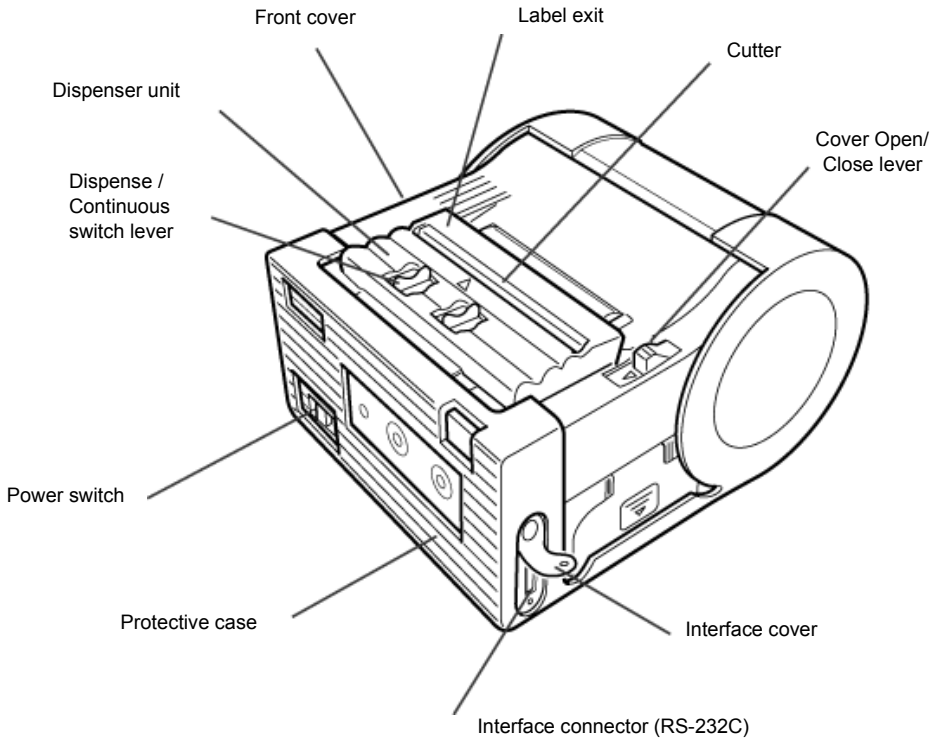

Figure 1-1a, Primary Features & Components

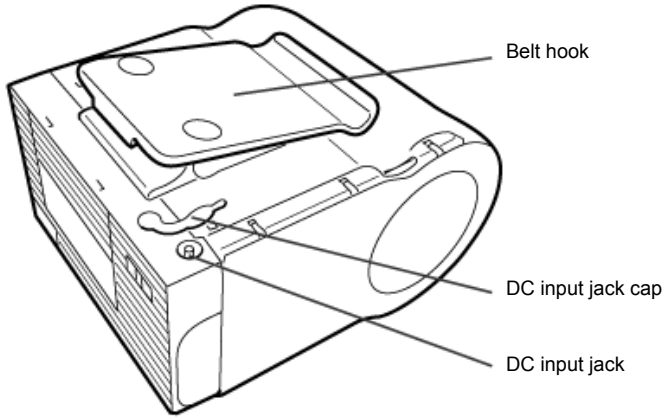

Figure 1-1b, Primary Features & Components

SWITCHES AND INDICATORS

The table below identifies and defines printer switches and indicators for operator interface. The accompanying graphics display their locations and appearance

SWITCHES	
Power Button	Two position on/off switch that controls power flow to the system.
Print Button	Two position on/off button that activates and deactivates print action.
Feed Button	Two position on/off button that activates and deactivates feed action.
INDICATORS	
Status LED	Indicates the systems' operational status.
DIP SWITCHES	
1-1, 1-3	Interface settings.
1-2	Reserved.
1-4	Auto Feed function.
1-5	Head Check function.
1-6, 1-7, 1-8	Factory Clear and Error Message assignment.
POTENTIOMETERS	
VR1	Eye-Mark Sensor adjustment.
VR2	Gap Sensor adjustment.
VR3	Print Position adjustment.
VR4	Print Darkness adjustment.

CONNECTION PORTS

These ports are externally accessable and permit connection of the accessories and attachments necessary for printer programming and operation. Not listed here, are the connection ports of circuit boards not externally accessable.

CONNECTION PORTS	
DC Supply Port	Connector permits 115V, 50/60 Hz supply via supplied cord.
Test Terminal	For connecting the TP Test Module.

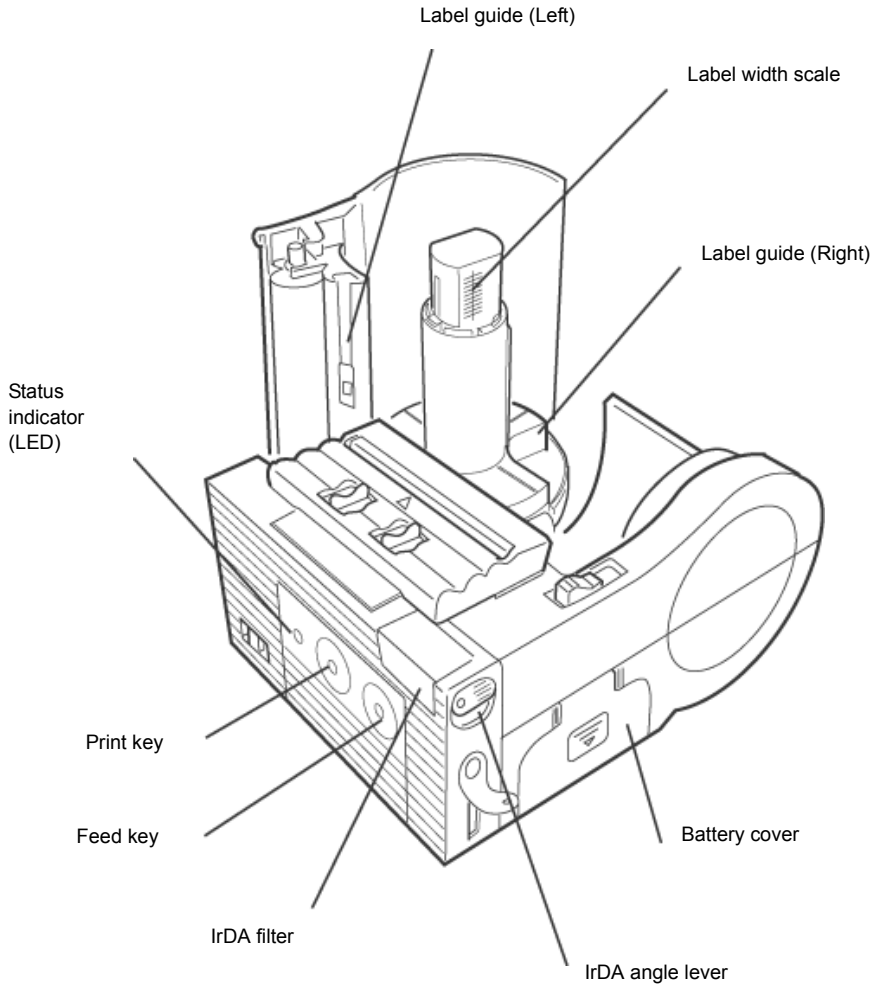

Figure 1-1c, Primary Features & Components

2

TECHNICAL DATA

All technical data deemed pertinent has been tabulated below for quick reference. Find the relative section header and then locate the specific type of technical data in the left column.

PHYSICAL CHARACTERISTICS	
Width	3.94 Inches (100 mm)
Height	2.93 Inches (74.5 mm)
Depth	5.04 Inches (128 mm)
Weight	.948 Pounds (430 g)

POWER	
Adapter Voltage	Autoswitching 100-240 VAC, 60 Hz
Battery Supply	Pack Type Lithium Ion Battery 1500mAh, 7.2v

ENVIRONMENTAL	
Operating Temperature	41° to 104°Farenheit (5° to 40°C)
Storage Temperature	23° to 113°Farenheit (-5° to 45°C)
Storage Humidity	20 to 80% Non-Condensing
Operating Humidity	20 to 80% Non-Condensing

PRINT	
Type	Direct Thermal
Speed	2.46 Inches Per Second (62.5 mm/s)
Resolution	203 Dots Per Inch (8 d/mm)
Maximum Print Width	1.9 Inches (48 mm)
Maximum Print Length	6.3 Inches (160 mm)

MEDIA	
Type	Super Sensitive, Techno, Synthetic, 2-Color, Journal, Linerless
Minimum Width	1.1 Inches (28 mm)
Maximum Length	6.4 Inches (163 mm)
Maximum Width	2.3 Inches (58 mm)
Type	Roll (Face out)
Maximum Caliper	0.007 Inches (0.18 mm)

MEDIA	
Maximum Roll Diameter	2.3 Inches (58 mm)
Minimum Core Diameter	1.04 Inches (26.5 mm)

INTERFACE MODULES	
Serial Port	RS232C/TTL (switchable)
Standard	Infrared
Special	RF
Special	Wireless / 802.11B

PROCESSING	
CPU	32 Bit RISC
FLash ROM	4 Mega-Bytes
SDRAM	16 Mega-Bytes

CHARACTER FONT CAPABILITIES	
MATRIX FONTS	
XB Font	48 dots W x 48 dots H
XS Font	17 dots W x 17 dots H (Universal Condensed Bold)
XM Font	24 dots W x 24 dots H (Universal Condensed Bold)
POP	80 dots W x 133 dots H
Kanji	16, 22, 24 dots W x 16, 22, 24 dots H
JIS 1 & 2 (optional)	

BAR CODE CAPABILITIES	
Linear Bar Codes	EAN-8, 13 CODABAR Code 39, 93, 128 Interleaved 2, 5 UPC-A, .E
Two Dimensional	Codabar PDF417 QR Code Maxicode (optional)
Ratios	1:2, 1:3, 2:5, User definable bar widths
Bar Height	4 to 999 dots, User progammable
Rotation	0, 90, 180, 270 Degrees
Sequential Numbering	Sequential numbering of both numerics and bar codes
Custom Characters	RAM storage for special characters
Graphics	Full dot addressable graphics

REGULATORY APPROVALS	
Safety	UL, CE, TUV, FCC-B
Noise	VCCI-B
Electrical Resistance	Level 2

3

INTERFACE SPECIFICATIONS

This unit presents the printer interface specifications. These specifications include detailed information on how to properly interface the printer with the host system. The four acceptable interface methods are:

- **RS232C Asynchronous Serial**
- **TTL Asynchronous Serial**
- **IrDA Infrared**
- **Bluetooth Wireless**
- **Wireless LAN 802.11B**

FACTORY DEFAULTS							
DSW 1-1	**DSW 1-2**	**DSW 1-3**	**DSW 1-4**	**DSW 1-5**	**DSW 1-6**	**DSW 1-7**	**DSW 1-8**
IF Specific	IF Specific	IF Specific	On	On	Off	Off	Off

INTERFACE CONFIGURATION			
DSW 1-1	**DSW 1-2**	**DSW 1-3**	**OPERATIONAL MODE**
Off	Off	Off	RS-232C
On	Off	Off	TLL
Off	On	Off	IrDA
On	On	Off	Bluethooth (mode 1 using PIN code)
Off	Off	On	RS-232C, IrDA
On	Off	On	TTL, IrDA
Off	On	On	Bluetooth (mode 2 no authentification)
On	On	On	Wireless LAN (802.11B)

WARNING: NEVER CONNECT OR DISCONNECT INTERFACE CABLES (OR USE A SWITCH BOX) WITH POWER APPLIED TO EITHER THE HOST OR THE PRINTER. THIS MAY CAUSE DAMAGE TO THE INTERFACE CIRCUITRY IN THE PRINTER/HOST AND IS NOT COVERED BY WARRANTY.

NOTE: Some hosts monitor the Request-To-Send (RTS) signal (pin 4 of 25) to determine if the printer is ready to receive data. Since the printer does not generate this signal, the RTS line must be held true (high) in order to allow communication. This can be performed by connecting the RTS pin to the Clear-To-Send (CTS) signal (pin 5 of 25).

RS232 SERIAL INTERFACE

This High Speed Serial Interface is a Plug-In Interface Module that can be connected to the printer by the user. The only difference between this interface and the TTL is their signal levels and cable pinouts.

RS232C SPECIFICATIONS	
Asynchronous ASCII	Half-duplex communication Bi-Directional Communication
Data Transmission Rate	4800, 9600, 19200, 38400 bps
Data Length	8 bit (selectable)
Stop Bit	1 bit (fixed)
Parity Bit	ODD, EVEN, NONE (selectable)
Codes Used	ASC II Character Codes, JIS Kanji Codes
Control Codes	STX (02H), ETX (03H), ACK (06H), NAK (15H)
Connector	Special
Cable	Special
Signal Levels	High = +3V to +12V, Low = -3V to -12V

INTERFACE SIGNALS		
PIN	**DIRECTION**	**SIGNAL DEFINITION**
1	Reference	SG (Signal Ground)
2	To Host	SD (Sending Data) - Data to the host computer from the printer.
3	To Printer	RD (Receive Data) - Data to the printer from the host computer.
4	---	Reserved
5	---	Reserved
6	Reference	SG (Signal Ground)
7	---	Reserved
8	---	Reserved
9	---	Reserved
10	---	Reserved
11	---	Reserved
12	Reference	SG (Signal Ground)

TTL INTERFACE

The only difference between this interface and the RS232C is their signal levels and cable pinouts.

TTL SPECIFICATIONS	
Asynchronous ASCII	Half-duplex communication
Data Transmission Rate	4800, 9600, 19200, 38400 bps
Data Length	8 bit (selectable)
Stop Bit	1 bit (fixed)
Parity Bit	ODD, EVEN, NONE (selectable)
Codes Used	ASC2 Character Codes, JIS Kanji Codes
Control Codes	STX (02H), ETX (03H), ACK (06H), NAK (15H)
Connector	Special
Cable	Special
Signal Levels	High = +2.0V to +3.3V Low = -0.5V to -0.8V

INTERFACE SIGNALS		
PIN	**DIRECTION**	**SIGNAL DEFINITION**
1	Reference	SG (Signal Ground)
2	---	Reserved
3	---	Reserved
4	---	Reserved
5	---	Reserved
6	Reference	SG (Signal Ground)
7	---	Reserved
8	To Host	SD (Sending Data) - Data to the host computer from the printer.
9	To Printer	RD (Receive Data) - Data to the printer from the host computer.
10	---	Reserved
11	---	Reserved
12	Reference	SG (Signal Ground)

WARNING: NEVER CONNECT OR DISCONNECT INTERFACE CABLES (OR USE A SWITCH BOX) WITH POWER APPLIED TO EITHER THE HOST OR THE PRINTER. THIS MAY CAUSE DAMAGE TO THE INTERFACE CIRCUITRY IN THE PRINTER/HOST AND IS NOT COVERED BY WARRANTY.

INFRARED DATA (IRDA) INTERFACE

Infrared communications is based on technology which is similar to entertainment remote control devices used in homes today. This technology offers a convient, interoperable, low power, and reliable way to connect computer and printer without the use of cables. The half duplex, serial data interconnection capabilities supports walk up point to point use.

The infrared transmission of print data is transferred from the terminal to the printer in four phases: (1) Connection, (2) Printer Status Check, (3) Data Transfer, (4) Disconnection.

IRDA SPECIFICATIONS	
Asynchronous ASCII	Half-duplex communication Ready/Busy Hardware Flow Control Pin 20, DTR Control Pin 4, RTS Error Condition X-On/X-Off Software Flow Control Bi-Directional Communication
Data Transmission Rate	9600, 19200, 38400, 57600 bps
Data Length	8 bit (selectable)
Stop Bit	1 bit (fixed)
Parity Bit	NONE
Codes Used	ASC2 Character Codes, JIS Kanji Codes
Control Codes	STX (02H), SYN (16H), EXT (03H), DLE (10H)
Communication Time	Time-Out: 5 seconds, Retry: over 500 milliseconds.
Receiving Type	Single item.
Signal Levels	
Compliance	HP-SIR Type of IrDA Standard IrSIR version 1.2. Upper levels are not implemented.

CONTROL CODE - DLE must be added just prior to SYN, STX, or ETX. DLE should also be added if the same code with DLE is included in the transferred message. With these two methods, any control code can be used in the transferred message.

FORMAT - All transferred messages from phase 1 to phase 4 take the following format to form the BCC calculation area. BCC is a 2-byte 16 bit SUM and the lower byte is placed at the head. The calculation of BCC is the sum of the header and data parts.

HEADER - The Header includes the type of transferred message (cmd) and packet number (cnt). However, some headers do not have a packet number.

Cmd is a single byte code that represents the type of packet. Cnt is only added when the packet is any of Data Response, Data Transmission Complete, or Transmission Termination Response, and represents the data packet number. The number begins from 1 and increments by one, every time the terminal receives a new packet. The printer responds wit the Response packet by putting the received number in it. Confirm the number matches with the terminal side.

Also, specify the total number of transferred packet for the Data Transmission Complete/ Transmission Complete Response packets.

MESSAGE FORMATS				
SSS, YYT, NNX	Header, variable length	Data, variable length	EXT	BB, CC, CC, lh

HEADER PACKETS	
Connection Request/Connection Response packet	40H
Printer Status Inquiry/Printer Status Response packet	14H
Data Header/Response packet	03H
Data/Data Response packet	15H
Data Transmission Complete/Transmission Complete Response packet	17H
Disconnection Request/Disconnection Response packet	41H

DATA ITEMS	
SPACE(13)	Dummy data.
null(4)	Dummy data.
size(4)	Data size.
len(2)	Data block length (maximum 256 bytes).
block	Data block (maximum 256 bytes).
status(4)	Status
id(6)	Printer ID (ASC2 specification).
flag	Packet status flag

ACK/NAK PROTOCOL

Bi-Directional ACK/NAK protocol is used for error control. In a normal transmission sequence when the transmission is received, the printer will return an ACK (06H) signifying that it was received without a transmission error. After the transmission command structure has been analyzed, a status byte is returned to the host. This status byte informs the host of the validity of the command structure.

If the command structure is error free, the printer proceeds with the print operation. When the print operation is completed, a Printer Status message is returned to the host. If an error was detected during the initial transmission sequence, a NAK (15H) will be returned signalling to the host that the received transmission contained errors and must be resent. If the returned Status byte indicates a command structure error, the error must then be corrected before the print data is resent to the printer.

A valid transmission to the printer must be bounded by an STX/ETX pair, with the STX (02H) signifying the start of the Print Data and ending with an ETX (03H) signifying the end.

RECEIVE BUFFER

The data stream is received from the host to the printer one job at a time. This allows the software program to maintain control of the job print queue so that it can move a high priority job in front of ones of lesser importance.

The printer receives and prints one job at a time. If a print job exceeds the buffer size, transmission will be rejected by the printer. Flow control protocols to throttle transmission are not used. Error conditions that occur during the Print Data transmission will cause the printer to return a NAK.

4

PRINTER CONFIGURATION

The printer may be configured for specific jobs via the operator and interface panels. The operator panel is located on the face of the front housing cover and is comprised of a power switch, Print button, Feed button, and a Status LED.

The interface panel is located under the hinged cover beneath the operator panel. The interface panel is comprised of three eight dip switch complexes, three potentiometers, and an interface connector located to the right.

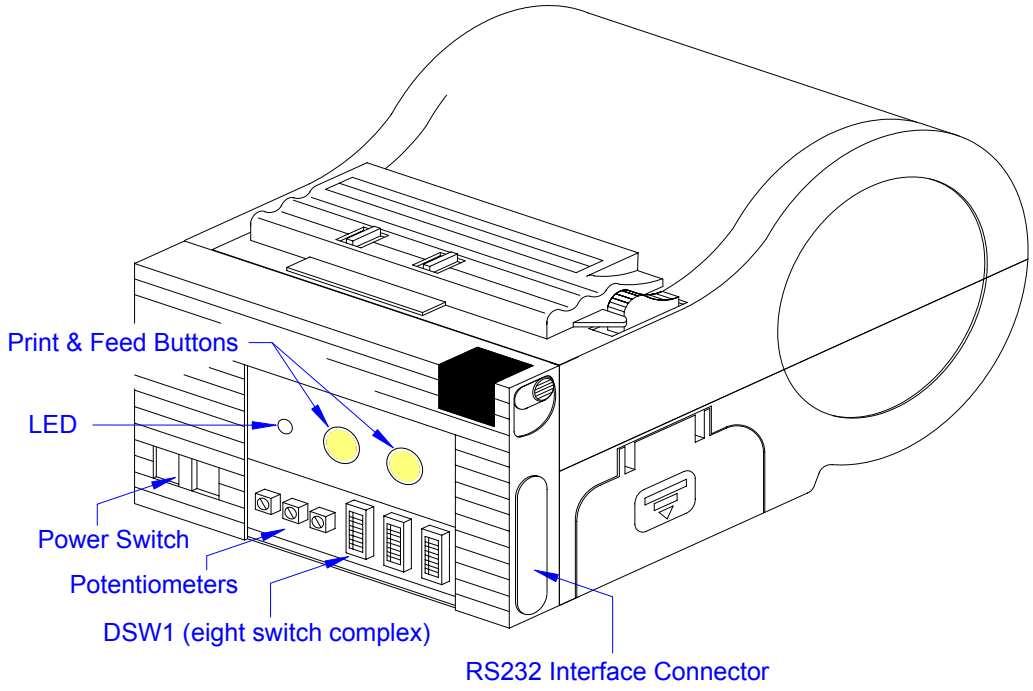

Figure 4-1, Interface Panel

DIP SWITCH COMPLEX DSW1

The following tables provide guidance on the enabling/disabling of various functions and features. This chapter deals solely with dip switch complex DSW1.

FACTORY DEFAULTS							
DSW 1-1	**DSW 1-2**	**DSW 1-3**	**DSW 1-4**	**DSW 1-5**	**DSW 1-6**	**DSW 1-7**	**DSW 1-8**
IF Specific	IF Specific	IF Specific	On	On	Off	Off	Off

INTERFACE CONFIGURATION			
DSW 1-1	**DSW 1-2**	**DSW 1-3**	**OPERATIONAL MODE**
Off	Off	Off	RS-232C
On	Off	Off	TLL
Off	On	Off	IrDA
On	On	Off	Bluetooth (mode 1 using PIN code)
Off	Off	On	RS232C, IrDA
On	Off	On	TTL, IrDA
Off	On	On	Bluetooth (mode 2 no authentification)
On	On	On	Wireless LAN (802.11B)

AUTOFEED & HEAD CHECK CONFIGURATION	
DSW 1-4	**Off:** Manual Feed or Factory Offset / **On:** Auto Feed or Print Darkness adjustment
DSW 1-5	**Head Check** - Off: Disabled / On: Enabled

MODE CONFIGURATION			
DSW 1-6	**DSW 1-7**	**DSW 1-8**	**OPERATIONAL MODE**
Off	Off	Off	Factory Clear Mode w/o counter clear
On	Off	Off	Factory Clear Mode w/ head counter clear
Off	On	Off	Factory Clear Mode w/ head counter & factory counter clear
On	On	Off	Reserved
Off	Off	On	Dispenser Operation
On	Off	On	Hex Dump Mode
Off	On	On	Font Download
On	On	On	Program Download

NOTE: Some button/key combinations are required when altering some dip switches. Refer to the relative mode in the Configuration Modes chapter to follow for guidance.

DIP SWITCH COMPLEX DSW2

The DSW2 dip switch complex is used for configuring the IrDA Interface. For instructions on this configuration, contact SATO Technical Support for guidance. The factory defaults are provided below in case of accidental alteration of their settings.

CAUTION: DO NOT CHANGE THE DEFAULT SETTINGS UNLESS DIRECTED OTHERWISE.

NOTE: The IrDA Interface for this unit is not compatible with LPT or COM.

FACTORY DEFAULTS							
DSW 2-1	**DSW 2-2**	**DSW 2-3**	**DSW 2-4**	**DSW 2-5**	**DSW 2-6**	**DSW 2-7**	**DSW 2-8**
Off	Off	Off	Off	Off	Off	Off	Off

DIP SWITCH COMPLEX DSW3

Dip switch complex DSW3 allows the specification of a Bluetooth interface frequency. For instructions on this configuration, contact SATO Technical Support for guidance. The factory defaults are provided below in case of accidental alteration of their settings.

CAUTION: DO NOT CHANGE THE DEFAULT SETTINGS UNLESS DIRECTED OTHERWISE.

FACTORY DEFAULTS							
DSW 3-1	**DSW 3-2**	**DSW 3-3**	**DSW 3-4**	**DSW 3-5**	**DSW 3-6**	**DSW 3-7**	**DSW 3-8**
On	On	On	On	On	On	On	On

CONFIGURATION MODES

This section provides an overview of the various configuration modes of the operation menu. Refer to Figure 5-2 for initial activity and then advance to its relative section that follows.

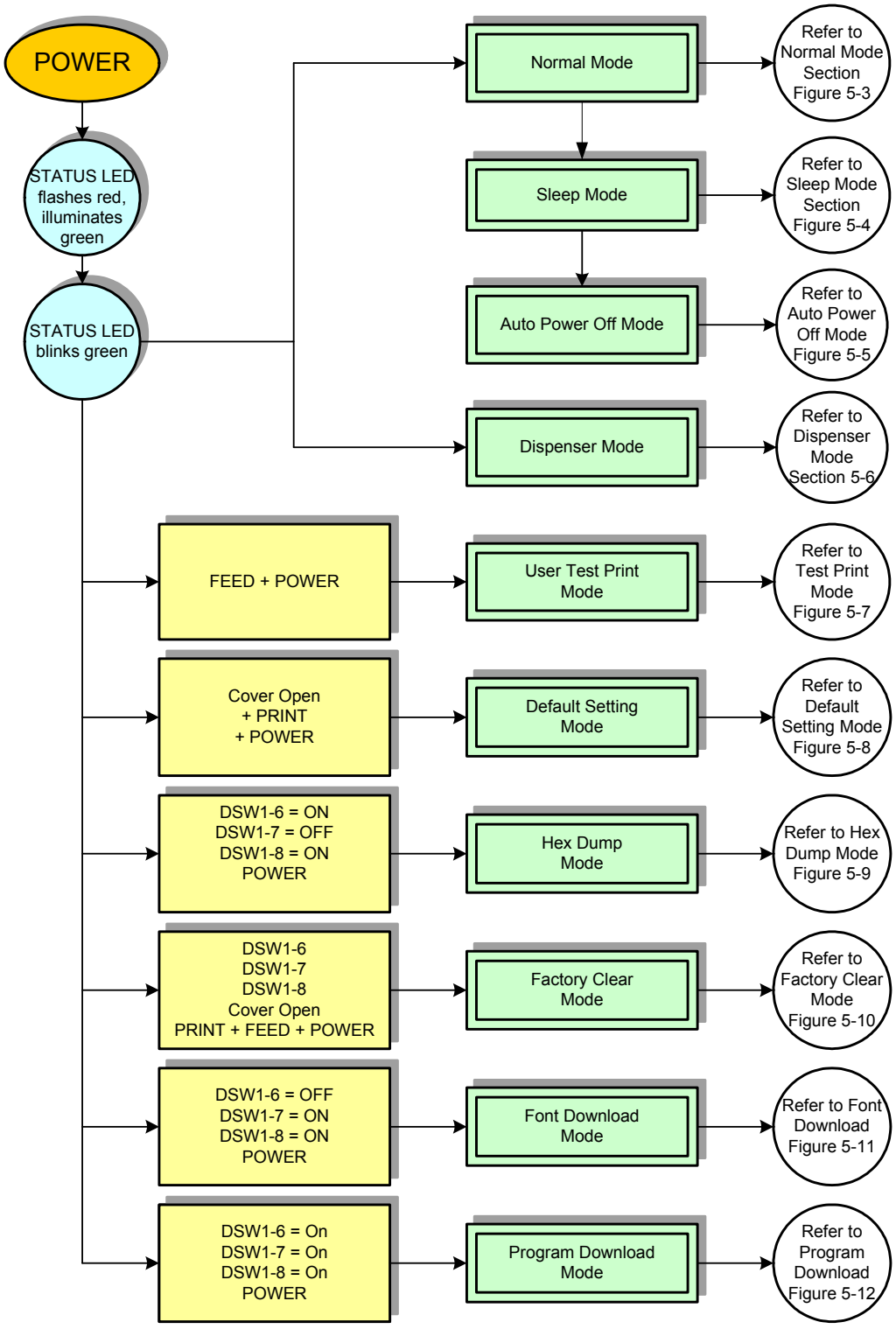
POWER
STATUS LED flashes red, illuminates green
STATUS LED blinks green
Normal Mode
Refer to Normal Mode Section Figure 5-3
Sleep Mode
Refer to Sleep Mode Section Figure 5-4
Auto Power Off Mode
Refer to Auto Power Off Mode Figure 5-5
Dispenser Mode
Refer to Dispenser Mode Section 5-6
FEED + POWER
User Test Print Mode
Refer to Test Print Mode Figure 5-7
Cover Open + PRINT + POWER
Default Setting Mode
Refer to Default Setting Mode Figure 5-8
DSW1-6 = ON DSW1-7 = OFF DSW1-8 = ON POWER
Hex Dump Mode
Refer to Hex Dump Mode Figure 5-9
DSW1-6 DSW1-7 DSW1-8 Cover Open PRINT + FEED + POWER
Factory Clear Mode
Refer to Factory Clear Mode Figure 5-10
DSW1-6 = OFF DSW1-7 = ON DSW1-8 = ON POWER
Font Download Mode
Refer to Font Download Figure 5-11
DSW1-6 = On DSW1-7 = On DSW1-8 = On POWER
Program Download Mode
Refer to Program Download Figure 5-12

Figure 4-2, Configuration Modes

NORMAL MODE

Figure 5-3 provides the specific sequence of events required by the operator, the printer, and the printer's software for normal mode congiguration.

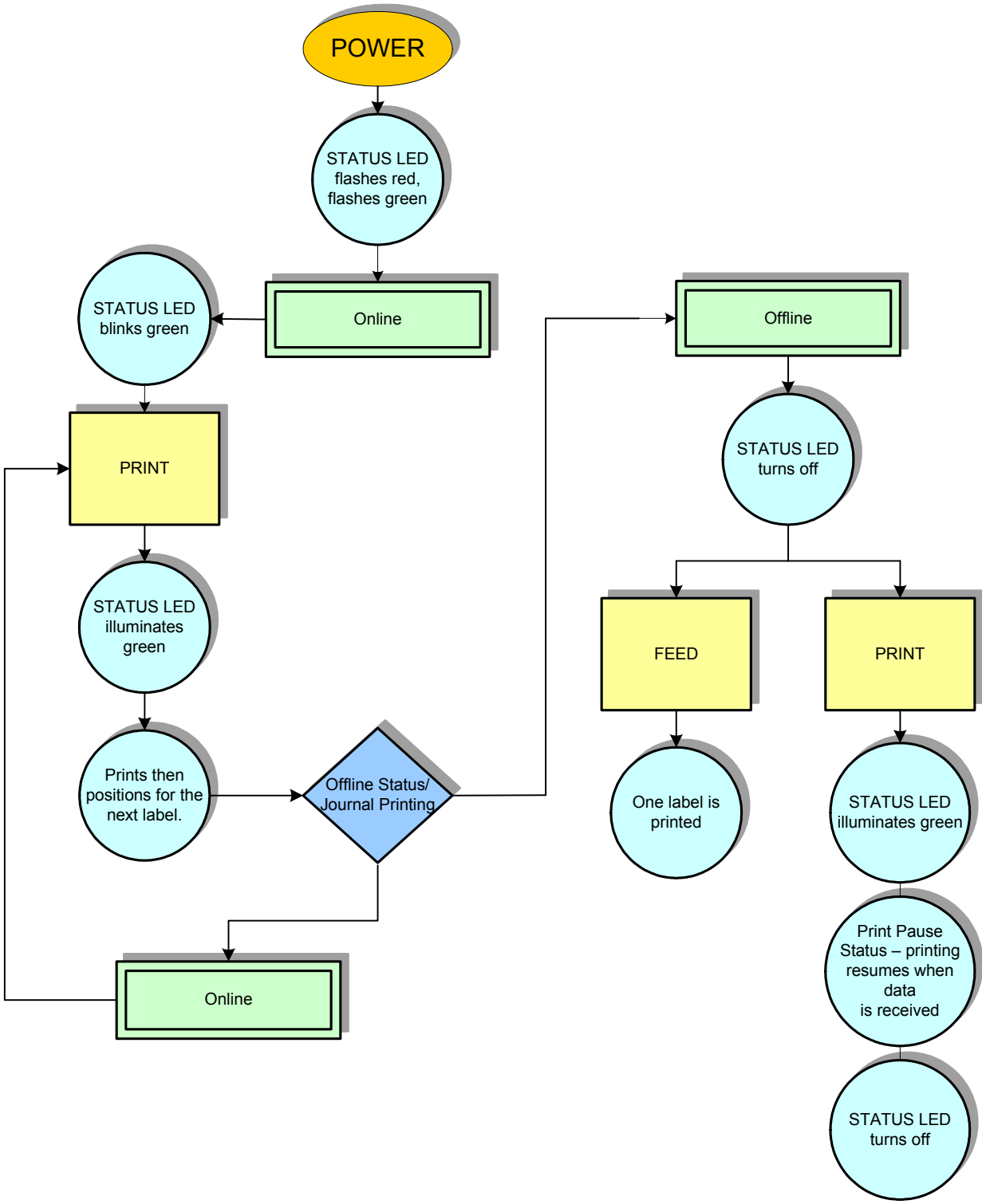

Figure 4-3, Normal Mode Configuration

SLEEP MODE

Figure 5-4 provides the specific sequence of events required by the operator, the printer, and the printer's software for sleep mode to be activated.

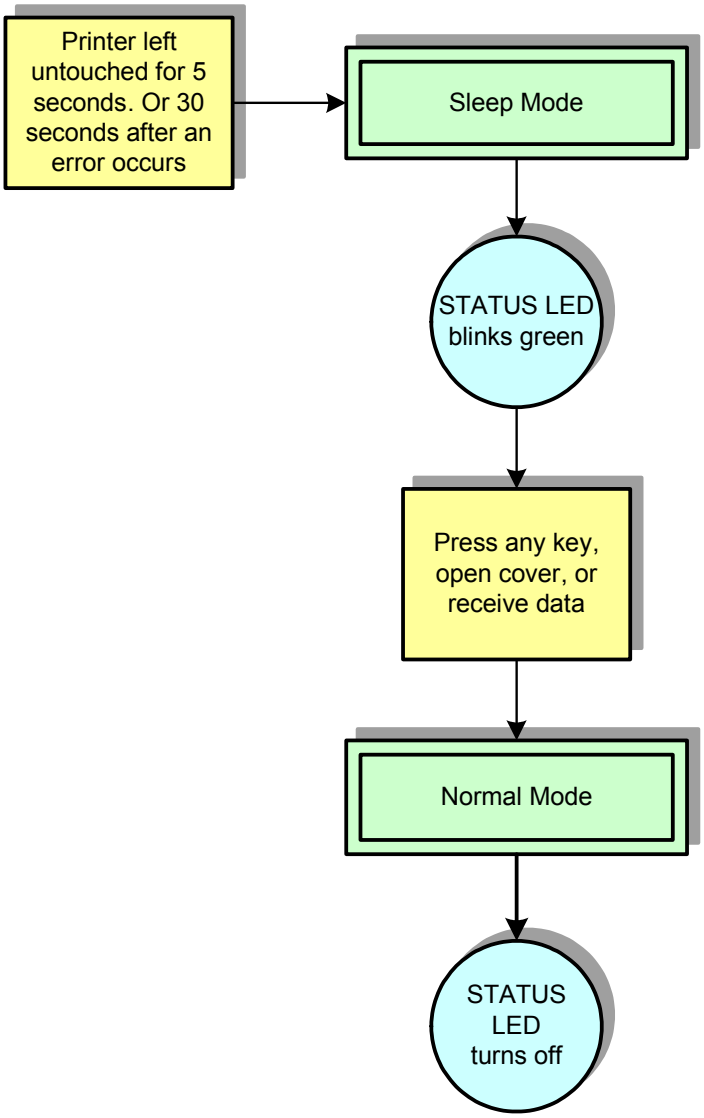
Printer left untouched for 5 seconds. Or 30 seconds after an error occurs
Sleep Mode
STATUS LED blinks green
Press any key, open cover, or receive data
Normal Mode
STATUS LED turns off

Figure 4-4, Sleep Mode

AUTO POWER OFF MODE

Figure 5-5 provides the specific sequence of events required by the operator, the printer, and the printer's software for the auto power-off mode to be activated.

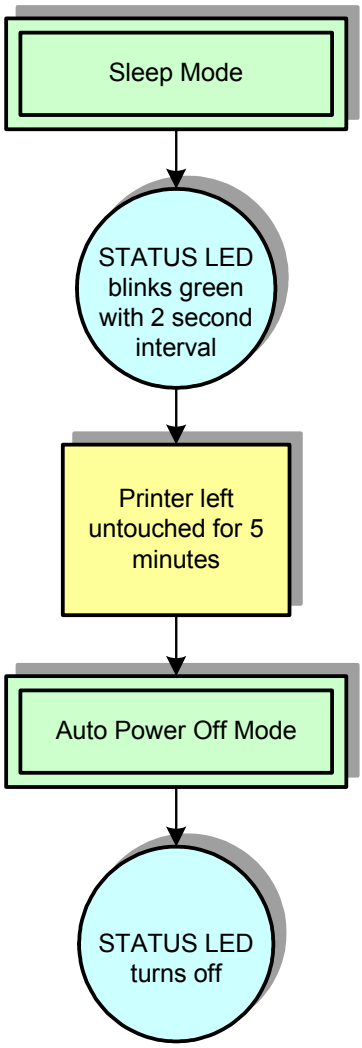
Sleep Mode
STATUS LED blinks green with 2 second interval
Printer left untouched for 5 minutes
Auto Power Off Mode
STATUS LED turns off

Figure 4-5, Auto Power Off Mode

DISPENSER MODE

Figure 5-6 provides the specific sequence of events required by the operator, the printer, and the printer's software for dispenser mode to be activated.

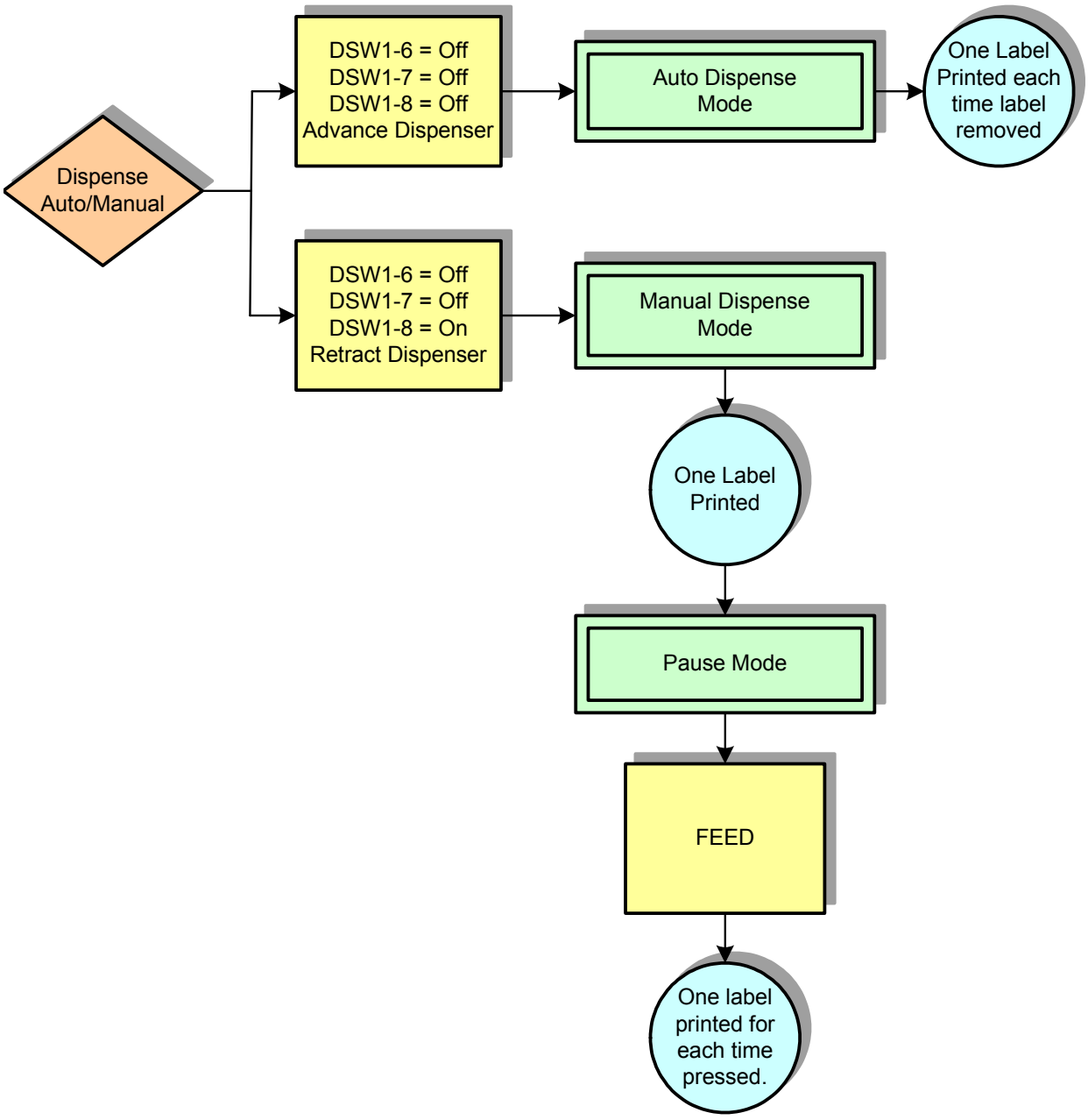

Figure 4-6, Dispenser Mode

USER TEST PRINT MODE

Figure 5-7 provides the specific sequence of events required by the operator, the printer, and the printer's software for the user test print mode to be activated.

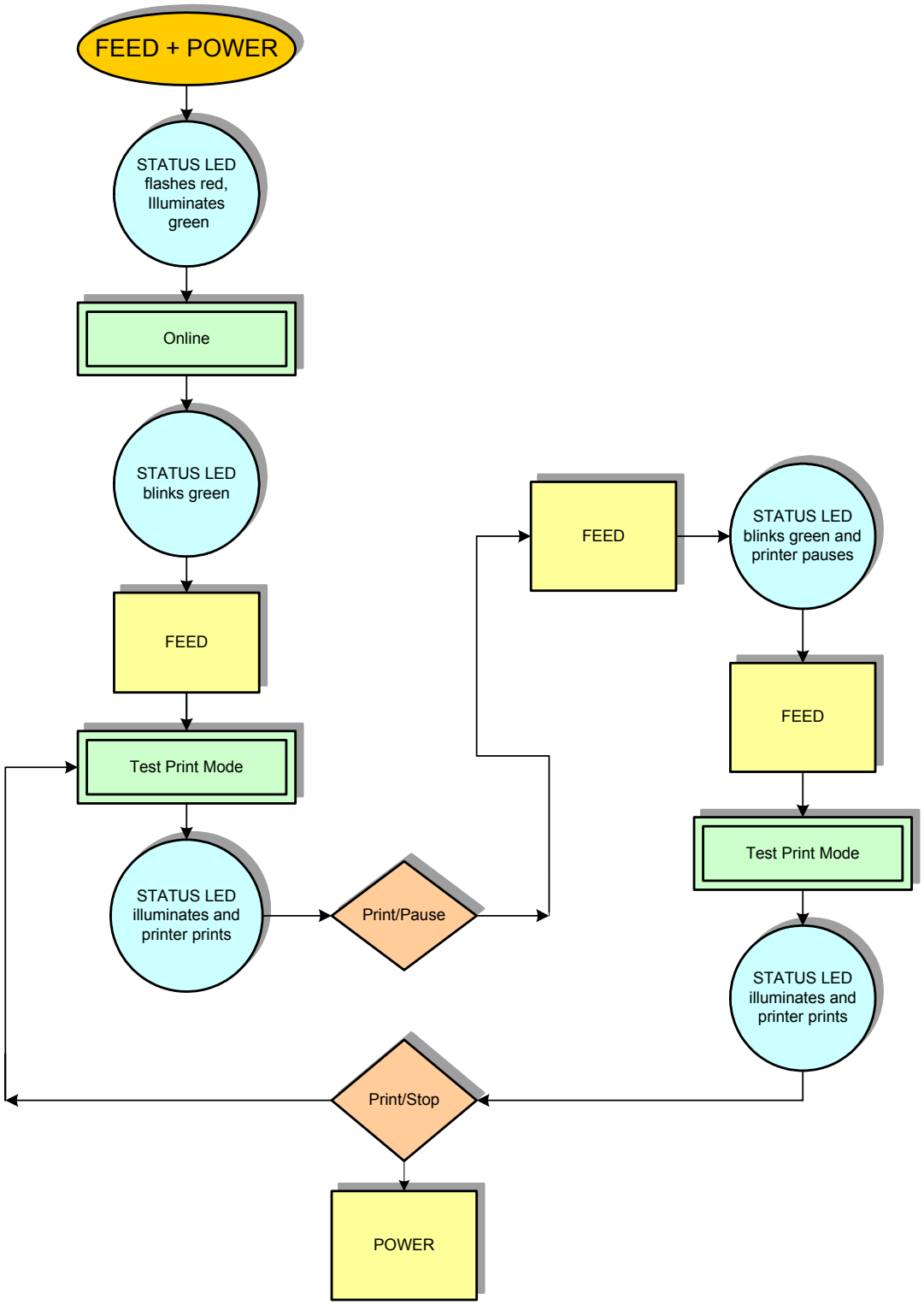

Figure 4-7, User Test Print Mode

DEFAULT SETTING MODE

Figure 5-8 provides the specific sequence of events required by the operator, the printer, and the printer's software for default setting mode to be activated.

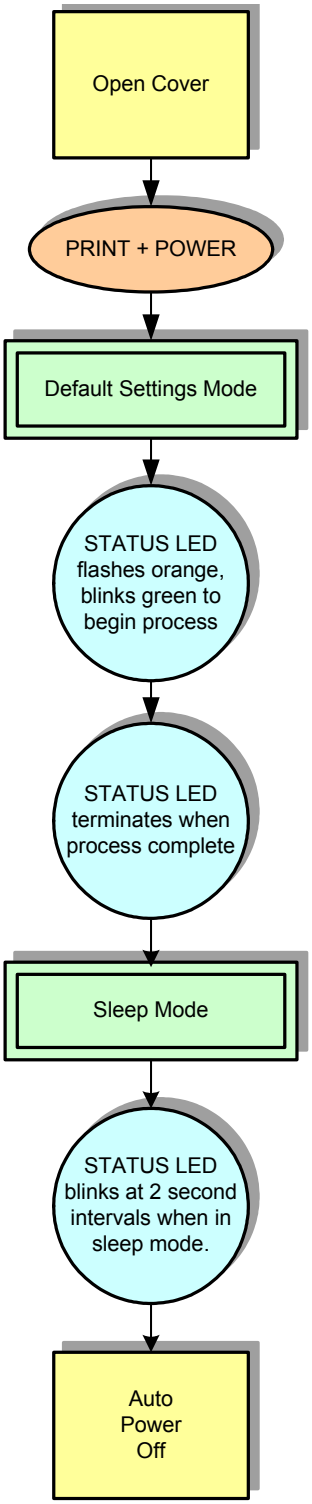
Open Cover
PRINT + POWER
Default Settings Mode
STATUS LED flashes orange, blinks green to begin process
STATUS LED terminates when process complete
Sleep Mode
STATUS LED blinks at 2 second intervals when in sleep mode.
Auto Power Off

Figure 4-8, Default Setting Mode

HEX DUMP MODE

Figure 5-9 provides the specific sequence of events required by the operator, the printer, and the printer's software for hex dump mode to be activated.

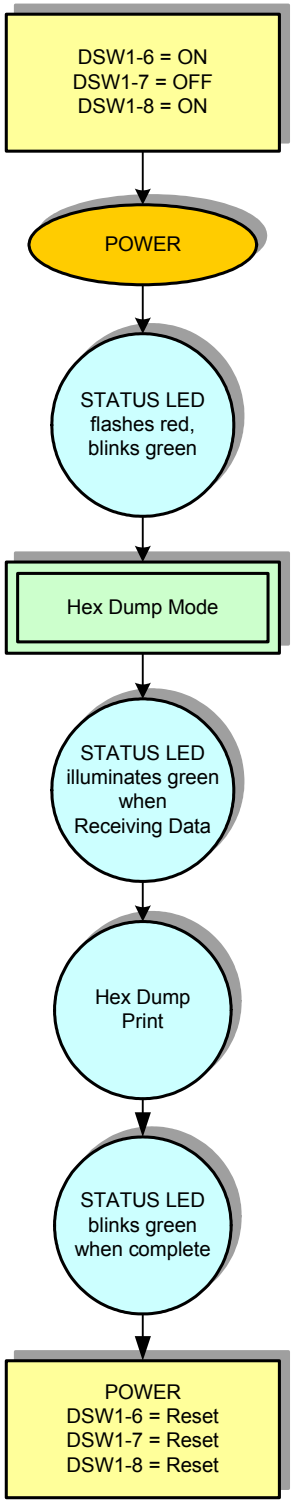

Figure 4-9, Hex Dump Mode

FACTORY CLEAR MODE

Figure 5-10 provides the specific sequence of events required by the operator, the printer, and the printer's software for factory clear mode to be activated.

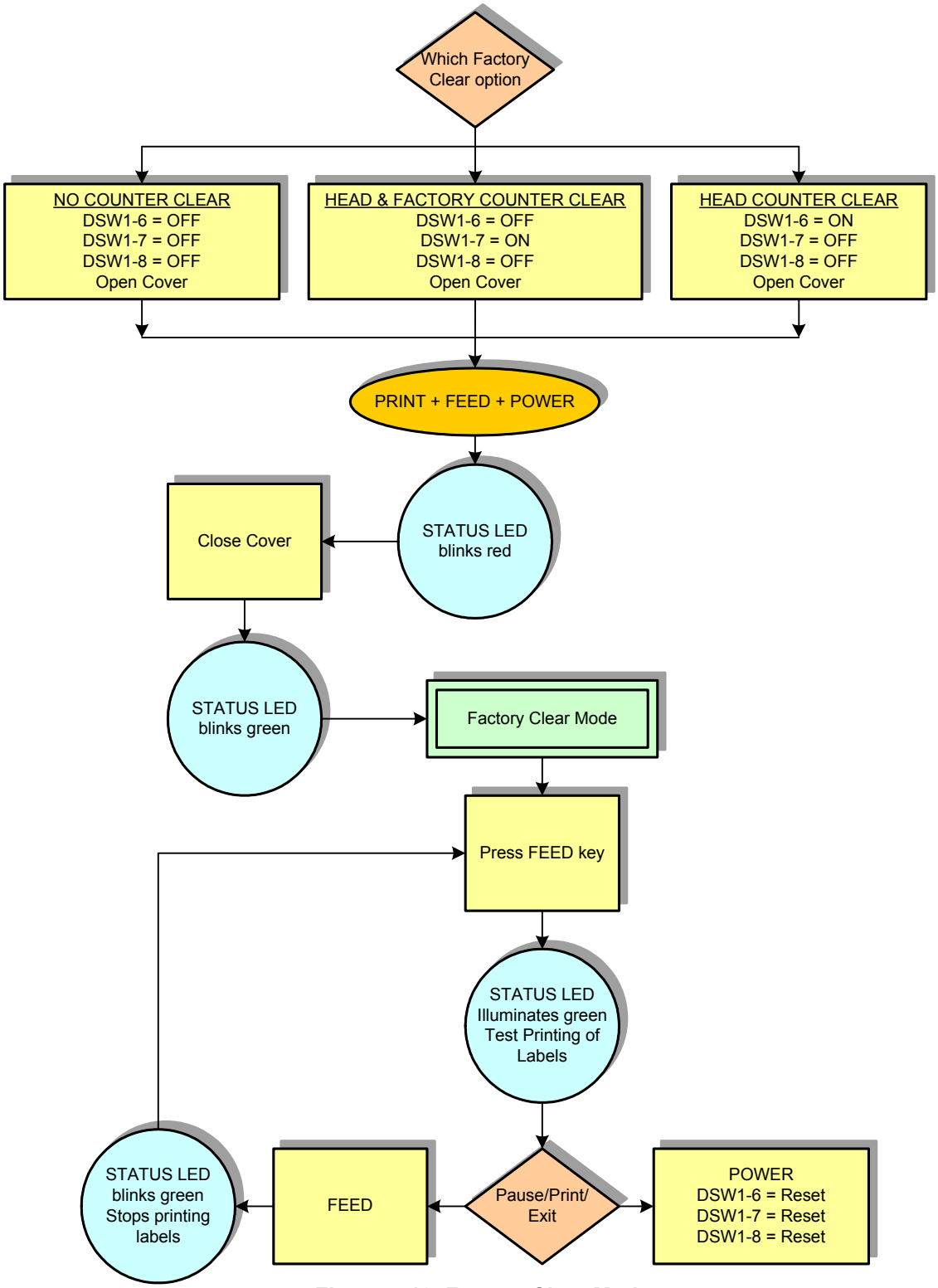

Figure 4-10, Factory Clear Mode

FONT DOWNLOAD MODE

A Flash ROM is used to internally store and delete font data and custom designed character data. The storage capacity for custom designed characters is a maximum of 95 for each type of 16 x 16, 22 x 22, and 24 x 24 dots.

There are four transmission protocols for font download: (1) Download Font Storage, (2) Download Font Deletion, (3) Download Font Information Aquisition, (4) Storage Custom-Designed Character. The return status from the printer is set between STX (02H) and ETX (03H), and transferred in 3 bytes. Note that the return status for the font data transfer when storing font is 1 byte of ACK (06H). All status data transferred from the host are set between STX (02H) and ETX (03H), and transferred in 3 bytes.

Wiring on the computer side may require a CTS (pin 5) and RTS (pin 4) cable connection. Confirm the host settings before downloading.

Figure 5-11 provides the specific sequence of events required by the operator, the printer, and the printer's software for font download mode to be activated.

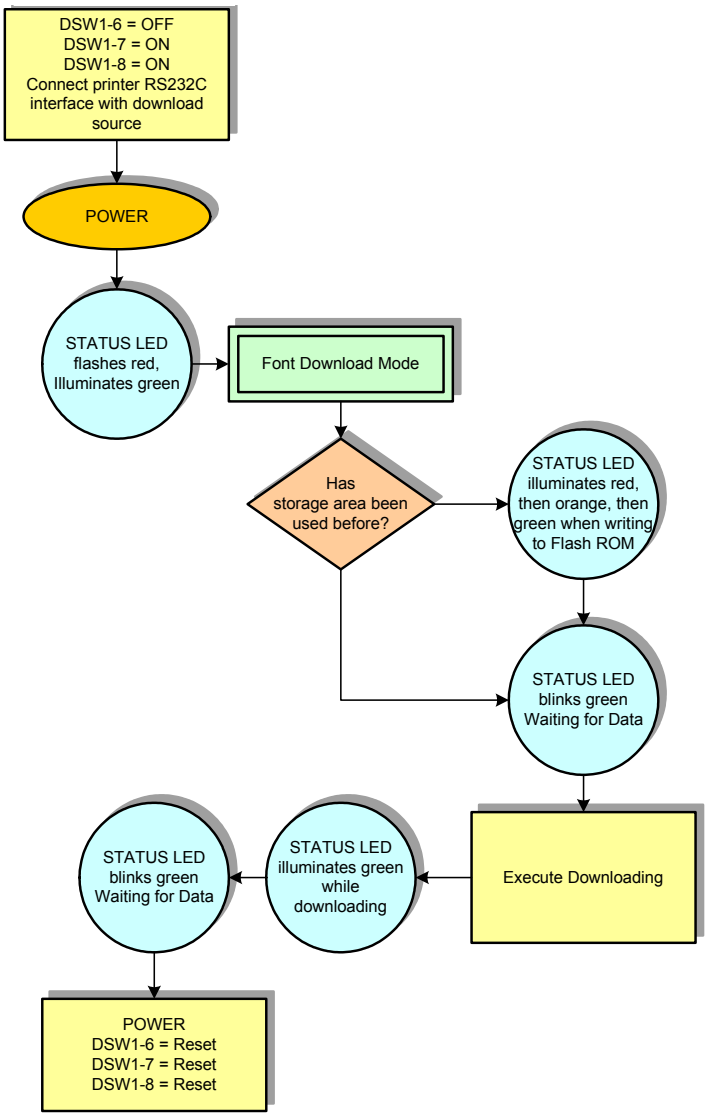
DSW1-6 = OFF
DSW1-7 = ON
DSW1-8 = ON
Connect printer RS232C interface with download source
POWER
STATUS LED flashes red, Illuminates green
Font Download Mode
Has storage area been used before?
STATUS LED illuminates red, then orange, then green when writing to Flash ROM
STATUS LED blinks green Waiting for Data
Execute Downloading
STATUS LED illuminates green while downloading
STATUS LED blinks green Waiting for Data
POWER
DSW1-6 = Reset
DSW1-7 = Reset
DSW1-8 = Reset

Figure 4-11, Font Download Mode

DOWNLOAD FONT REGISTRATION			
STATUS DESCRIPTION	**ACSII**	**HEX**	**TRANSFER**
Not Already Stored	A	41	Printer to Host
Already Stored	B	42	Printer to Host
Storage Area NG	N	4E	Printer to Host
Store Font	0	30	Host to Printer
Do Not Store Font	1	31	Host to Printer
Ready For Storage Status	O	4F	Printer to Host
Font Storage Completed Normally	E	45	Printer to Host
Font Storage Cancelled	S	53	Printer to Host
Font Storage Completed Abnormally	Z	5A	Printer to Host

DOWNLOAD FONT DELETION			
STATUS DESCRIPTION	**ACSII**	**HEX**	**TRANSFER**
Not Already Stored	A	41	Printer to Host
Already Stored	B	42	Printer to Host
Delete Font	0	30	Host to Printer
Do Not Delete Font	1	31	Host to Printer
Font Deletion Completed Normally	E	45	Printer to Host
Font Deletion Cancelled	S	53	Printer to Host
Font Storage Completed Abnormally	Z	5A	Printer to Host

DOWNLOAD FONT INFORMATION AQUISTION			
STATUS DESCRIPTION	**ACSII**	**HEX**	**TRANSFER**
Not Already Stored	A	41	Printer to Host
Already Stored	B	42	Printer to Host
Font Information Transferred OK	0	30	Host to Printer
Number of Transferred Data	000000-999999	6 bytes w/ 30-39	Printer to Host
Font Information	Font Info Data + Font Data Info		Printer to Host

STORAGE OF CUSTOM DESIGNED CHARACTER			
STATUS DESCRIPTION	**ACSII**	**HEX**	**TRANSFER**
Storage Ready Status	O	4F	Printer to Host
Storage Completed Normally	E	45	Printer to Host
Storage Completed Abnormally	Z	5A	Host to Printer

PROGRAM DOWNLOAD MODE

Figure 5-12 provides the specific sequence of events required by the operator, the printer, and the printer's software for program download mode to be activated.

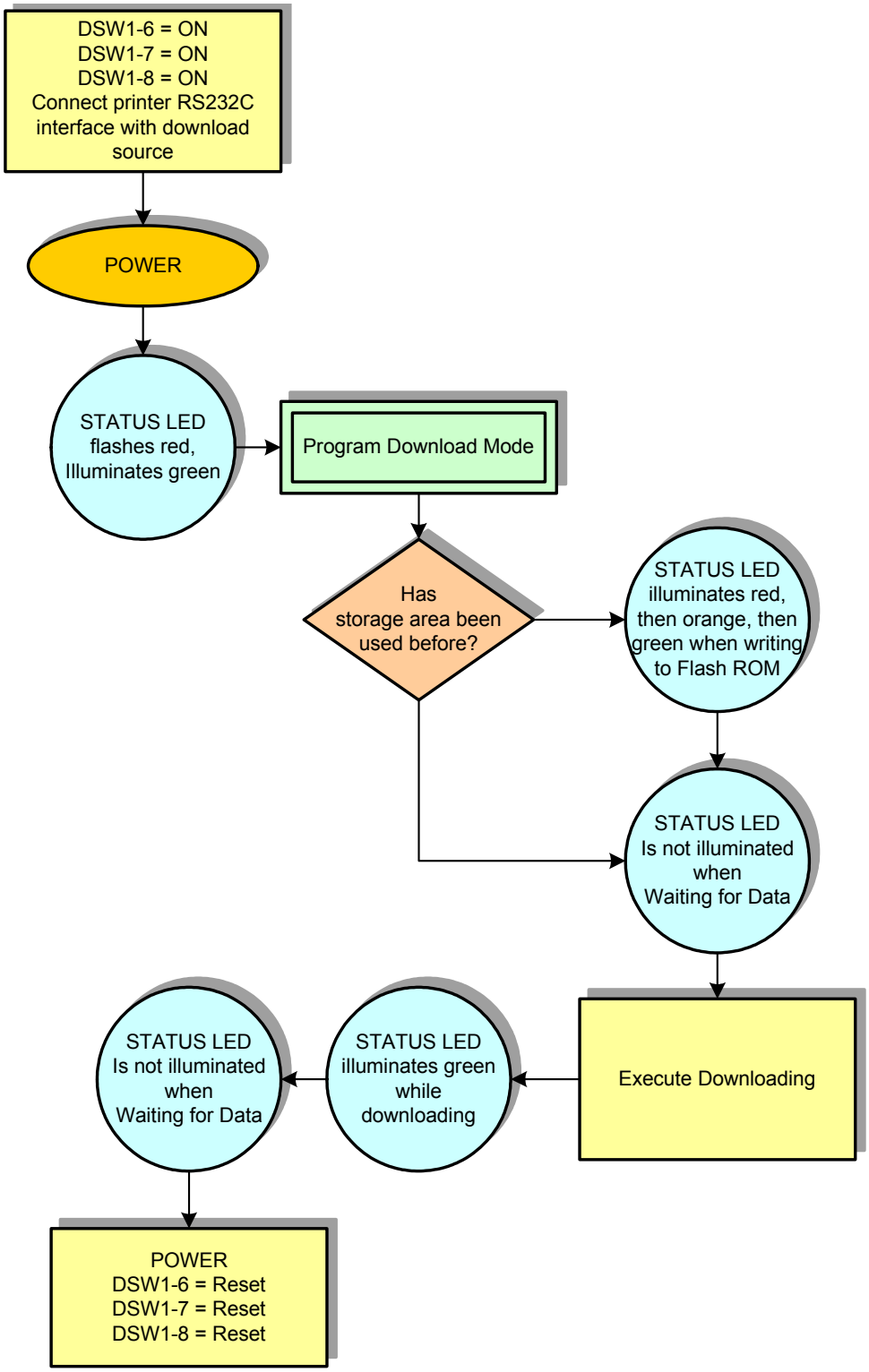
DSW1-6 = ON
DSW1-7 = ON
DSW1-8 = ON
Connect printer RS232C interface with download source
POWER
STATUS LED flashes red, Illuminates green
Program Download Mode
Has storage area been used before?
STATUS LED illuminates red, then orange, then green when writing to Flash ROM
STATUS LED Is not illuminated when Waiting for Data
Execute Downloading
STATUS LED illuminates green while downloading
STATUS LED Is not illuminated when Waiting for Data
POWER
DSW1-6 = Reset
DSW1-7 = Reset
DSW1-8 = Reset

Figure 4-12, Program Download Mode

5

TROUBLESHOOTING

This unit is provides assistance in identifying the route cause of inadequate performance or complete failure. Whereas simple instructions may be provided here for problem correction, their indepth procedures will most likely be found in the Adjustment Procdures or Replacement Procedures sections of this manual.

ERROR SIGNALS		
STATUS LED	**MODE**	**RESOLUTION GUIDE**
Illuminated Red	After Power Input	Program or flash ROM error. Replace flash ROM or reload program.
Illuminated Orange	All Modes	Low battery. Recharge or replace.
Blinking Red	On-Line	Ensure cover is locked and the cover open switch is operational.
Blinking Red/Orange Alternately	On-Line	Received data is larger than buffer. Incorrect protocol setting.
Blinking Orange	On-Line	Damaged print head. Replace.
Blinking Orange/Green Alternately	All Modes	Print head protection feature that activates when the head rises above 131° F and deactivates when it cools down to 122° F (55°C - 50°C).
Blinking Green	Printing/Recieving	The buffer is near full. Pause the data transmission and allow the buffer to empty before retrying.

TROUBLESHOOTING TABLE	
IMAGE VOIDS	
Poor label quality.	Use high quality label stock.
Damaged print head.	Replace print head.
Damaged platen.	Replace platen.
LIGHT PRINT IMAGE	
Poor label quality.	Use high quality direct thermal label stock.
Low print head energy/darkness.	Adjust darkness level.
Foriegn material on print head.	Clean print head and platen roller.
Poor head alignment.	Align print head as required.
Excessive print speed.	Reduce print speed setting.

SMEARED PRINT IMAGE	
Poor label quality.	Use high quality direct thermal label stock.
Foreign material on print head and platen roller.	Clean print head and platen roller.
Foreign material on labels.	Use high quality label stock.
Excessive print head energy.	Adjust darkness control.
Excessive print speed.	Adjust speed as required.
FUZZY PRINT IMAGE	
Heat too high.	Adjust as required.
NO LABEL MOVEMENT	
Loose or broken platen drive gears.	Adjust or replace platen drive gears as required.
Incorrect label pitch sensor selected.	Select the correct label sensor type.
NO PRINTED IMAGE	
Print head is disconnected.	Ensure that print head wiring harness is connected on each end.
Low voltage output.	Test power supply voltage and replace as necessary.
Damaged print head.	Replace print head.
Damaged electronics.	Replace circuit board.
POWER LED NOT ILLUMINATED	
AC power cable disconnected.	Ensure the cable is connected at each end.
Defective power supply.	Test with meter and replace as required.
WILL NOT GO ON-LINE	
Defective power supply cord.	Ensure proper function or replace.
House power supply discontinued.	Test receptacle.
Battery pack power depleted.	Recharge or replace.

RS232 SERIAL INTERFACE TROUBLESHOOTING

- Ensure the serial cable is thoroughly connected to the PC and the printer.

> **CAUTION:** NEVER CONNECT OR DISCONNECT INTERFACE CABLES (OR USE A SWITCH BOX) WITH POWER APPLIED TO EITHER THE PRINTER OR THE HOST. THIS MAY CAUSE DAMAGE TO THE INTERFACE CIRCUITRY AND IS NOT COVERED BY WARRANTY.

- Ensure the serial cable is not defective and that it is manufactured to specifications.
- Ensure the RS232 Interface Module is properly installed.

- Ensure the data stream is correct (all letters of command codes are in upper case and without spaces).
- Ensure the Baud rate, Parity, Data Bits, and Stop Bits are consistent with that of computer. Print a Configuration Test Label to determine the RS232 settings.
- Ensure the printer is recieving from the computer using the Hex Dump Mode. Refer to that procedure for instructions. The printer will print (only once) a hexadecimal dump of everything it has received from the host computer. Each hexadecimal character represents a character the printer received. Analyze and troubleshoot the data stream.

> NOTE: A small label may produce a large amount of data when printed in Hex Dump.

While checking the hex dump printout, look for OD_h OA_h (carriage return and line feed) characters throughout. The command string should be continuous. CR or LF charcters are not allowed between the start command (<ESC>A) and the stop command (<ESC>Z). If Basic is being used, it may be adding these characters automatically as the line wraps. Adding a width statement to your program can help suppress these extra OD_H OA_H characters by expanding the line length up to 255 characters.

If not programming in BASIC, check to see if the equivalent statement in language exists to suppress extra carriage returns and line feeds from data being sent to the printer. The data stream must be one complete line going to the printer.

PRINT TEST LABEL

The contents of the Print Buffer can be examined using the Hex Dump mode. In the left column, each line of data received is numbered. The center column provides the data in hexadecimal format. And in the right column, the same data is provided in the ASC II format. Follow the instructions below for guidance.

1. Power off the printer (if on).
2. Place the DSW1-6 switch in the ON position.
3. Place the DSW1-7 switch in the OFF position.
4. Place the DSW1-8 switch in the ON position.
5. Power on the printer.
6. Print a diagnostic label.
7. Turn the printer off and then back on to return to the normal print mode.
8. Return switch DSW1-8 to the OFF position.
9. Return switch DSW1-7 to the ON position.
10. Return switch DSW1-6 to the OFF position.

6

MAINTENANCE

This unit includes all of the operator approved maintenance activities.

CLEANING PROCEDURES

Cleaning of the printer is a necessary maintenance activity to ensure print quality and long printer life. There are two basic types of cleaning involved; the removal of loose debris and the removal of residue.

Use a soft cloth and/or a pneumatic blower (pressurized air) to remove debris from the printer. This process should be performed prior to the removal of residue. To remove residue, apply SATO Solvent or isopropryl alcohol to a clean cotton swab and gently wipe the entire surface of the print head and platen roller until clean.

> **WARNING: ALLOW THE PRINT HEAD TO COOL TO ROOM TEMPERATURE PRIOR TO CLEANING.**

PLATEN ROLLER REPLACEMENT

The platen roller is considered to be a high wear component due to its treading against the print media. This treading contact will eventually wear grooves into the rubber material and negatively effect print output.

1 Switch off the printer and disconnect the power supply.

2 Remove protective rubber from printer's exterior, open top housing cover (1, Figure 7-1).

> NOTE: The top housing cover is removed from Figure 7-1 to optimize viewing of relative components.

3 Detach dispenser bar (2) from top housing cover (1).

> NOTE: The dispenser bar snaps free from the left end as viewed in the illustration, then withdraw the right end.

4 Detach worn platen roller assembly (3) from top housing cover (1).

5 Snap replacement platen roller assembly (3) into top housing cover.

> NOTE: Insert the geared end of replacement platen roller assembly into place first followed by opposite end. Ensure the gear of the replacment platen roller assembly meshes with those of the dive train.

6 Snap dispenser bar (2) into top housing cover (1).

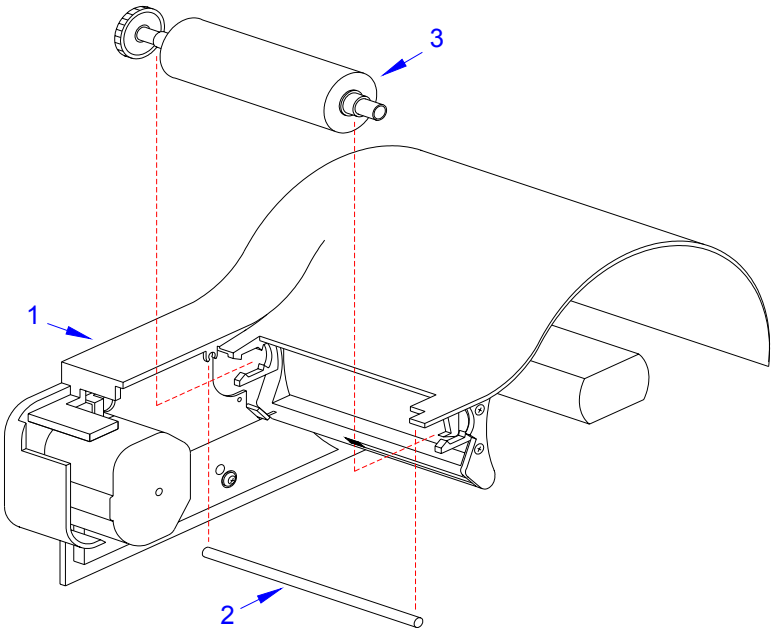

Figure 7-1, Platen Roller Replacement

7

ADJUSTMENT PROCEDURES

This section of the manual provides instruction of all printer operational adjustments. Adjustments for the MB200 printer are minimal. Almost all adjustments are electrical in nature due to self aligning and balancing design features.

POSITION ADJUSTMENTS		
Adjustment	**Method**	**Adjustment Description**
Factory Offset	Switch DSW1-4 to the Off position, then adjust the VR3 potentiometer.	
Printer Setting Commands	Use the <PG> programming command.	Saves the values to the Flash ROM.
Base Point Offset		
Pitch Offset		
Dispense Offset		
Tear-Off Offset		
Base Point Offset	Use the <A3> programming command.	Takes effect after specified and the value is cleared once the power is turned off.
Pitch Offset	Use the <PO3> programming command.	Takes effect after specified and the value is cleared once the power is turned off.
Dispense Offset	Use the <PO1> programming command.	Takes effect after specified and the value is cleared once the power is turned off.
Tear-Off Offset	Use the <PO2> programming command.	Takes effect after specified and the value is cleared once the power is turned off.